

"Newton's Laws Recap" Review:

4. No. inertia \rightarrow mass

10. C, D, A, B

8. mass and velocity

9. Yes, we can change the velocity.

Weight and Mass:

- Weight \rightarrow measure of force from the acceleration due to gravity
 - Weight is a vector (mass is a scalar)
 - Direction is typically down
 - Dependent on acceleration due to gravity
 - Earth = 9.8 m/s^2
 - Moon = 1.6 m/s^2

- Equation for Weight:

$$\vec{F}_g = m a_g \quad g = \text{gravitational attraction}$$

$$\vec{F}_g = m g$$

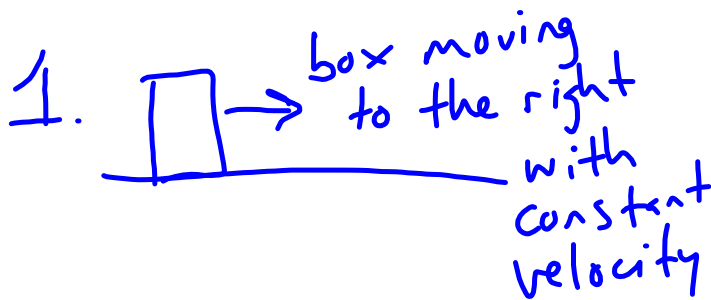
$$a_g = g = (\text{on Earth}) 9.8 \text{ m/s}^2 \text{ down}$$

- Units \rightarrow Newtons (pounds in English system)
- Mass \rightarrow the same everywhere

- Friction:

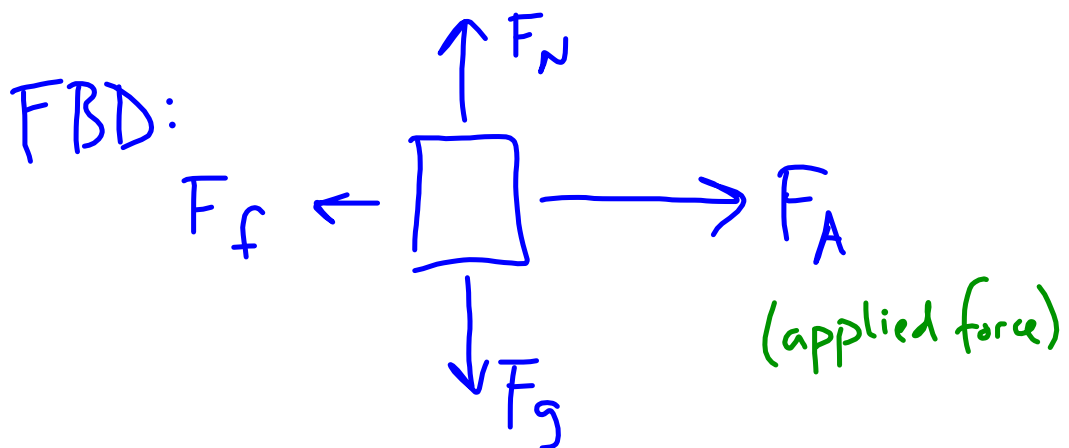
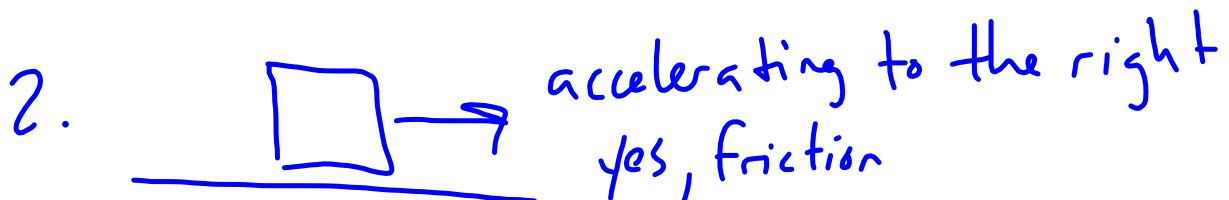
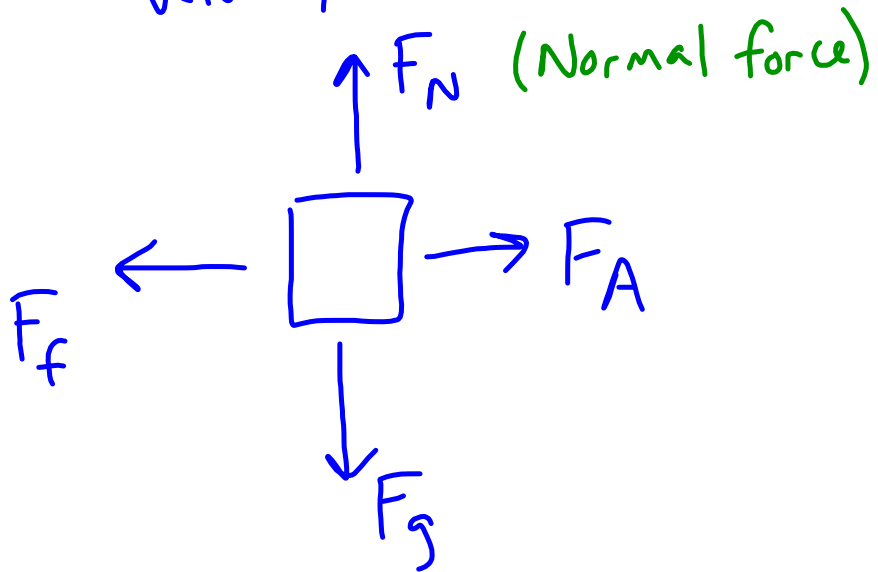
- Force that comes between contact of two surfaces
- All surfaces at an atomic level are "rough" → Friction is always present
- Friction can be minimized, but never eliminate if objects are physically contacting
- Force of friction is always opposite the direction of motion

• FBD's with Multiple forces:



$$a = 0 \text{ m/s}^2$$

FBD:



- Equilibrium \rightarrow balanced sets of forces
 - Object is:
 - At rest in one direction
 - Moving with constant velocity in one direction
- Non-equilibrium \rightarrow unbalanced forces in one (or both) direction(s)
 - Acceleration will happen in the direction of the greater force